

PRICE  
15¢

TECHNOLOGY DEPT.

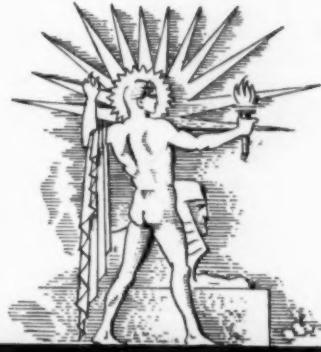
PUBLIC LIBRARY

AUG 8 - 1939

DETROIT

# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE.



August 5, 1939

Photographed for Science

See page 83



A SCIENCE SERVICE PUBLICATION

# Do You Know?

Except in the sea, insects can thrive where plants can.

One colossal statue in Egypt is made of a granite block of over 100 tons.

Freezing ticks, lice, and fleas does not prevent them from carrying disease, according to tests.

A newborn baby has 270 bones; but some of these join, and a full grown adult has only 206.

Efforts to send lake trout and whitefish eggs to Lake Titicaca in Bolivia are being made by the U. S. Bureau of Fisheries.

Plaster casts of fractured stones are being taken by archaeologists restoring the great prehistoric stone circle at Avebury in England.

British scientists are seeking the whereabouts of Charles Darwin's geological collection from Tasmania, which is not in the Darwin Museum nor otherwise accounted for.

Danish cattle and horse breeders are experimenting with electric fences to enclose stock, since as high as 90 per cent. of domestic hides have shown cuts and scratches from barbed wire.

Blonds are 40 to 170 per cent. more susceptible to ultraviolet rays than brunettes, and men are about 20 per cent. more susceptible than women, says a writer in the *Journal of the American Medical Association*.

## QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

### AERONAUTICS

What was the speed of the first Army airplane? p. 85.

### ASTRONOMY

How many supernovae have ever been observed? p. 84.

How wide are the so-called "canals" of Mars? p. 86.

### CHEMISTRY

What are the three most important groups of chemical raw materials? p. 88.

### ENGINEERING

How heavy is transcontinental tourist travel? p. 89.

### ENTOMOLOGY—PHOTOGRAPHY

How fast does a fruit fly's wings beat? p. 83.

### EXPLORATION

What will be worn by the members of the Antarctic Expedition? p. 88.

### FORESTRY

What proportion of forest fires this year has been started by man? p. 89.

### GEOGRAPHY

How many people will have to move from the path of China's Yellow River? p. 87.

### MEDICINE

How has the Lindbergh-Carrel heart recently contributed to medical research? p. 85.

What may replace anesthetics for surgery of the future? p. 84.

What new remedy has been found for rabbit fever? p. 83.

What type of body cells grow faster at night? p. 88.

### MEDICINE—BOTANY

What is the best way to get rid of ragweed? p. 90.

### METALLURGY

What does silver do for stainless steel? p. 95.

### PHYSIOLOGY

What ailments is the new vitamin K being used to treat? p. 94.

### PSYCHOLOGY

What is baby's first music lesson? p. 88.

Skulls of two shovel-jawed mastodons—million-year-old elephants—have been found in Texas.

It took builders who could swim to construct Minot's Ledge Lighthouse, on a reef outside Boston harbor.

By a new system, pictures six by seven inches can be transmitted from Europe to the United States in 20 minutes.

Most of children's fears are about imaginary things, such as ghosts and bogeymen, it was found in a survey of 400 children aged five to 12.

A pocket gopher's pockets are in its cheeks.

Science has yet to produce stringless celery, but the newest varieties come nearer to it than any before.

A survey at Cornell University indicates that students from farms are twice as likely to become farmers as city boys are to follow their fathers' careers.

In starting a window box, a floriculturist suggests combining vines, and "accent plants" which stand out because of color or form, and "filler plants" which complete the design.

## SCIENCE NEWS LETTER

Vol. 36 AUGUST 5, 1939 No. 6

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 2101 Constitution Avenue, Washington, D. C. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years \$7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

In requesting change of address, please give your old address as well as the new one, at least two weeks before change is to become effective.

Copyright, 1939, by Science Service, Inc. Reproduction of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service.

Cable address: Scienserve, Washington.

Entered as second class matter at the post-

office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and in the Engineering Index.

Members of the American Association for the Advancement of Science have privilege of subscribing to SCIENCE NEWS LETTER at \$3 a year.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Advertising rates on application. Member Audit Bureau of Circulation.

SCIENCE SERVICE is the institution for the Popularization of Science organized 1921 as a non-profit corporation, with trustees nominated by the National Academy of Sciences, the National Research Council, the American Association for the Advancement of Science, the E. W. Scripps Estate and the journalistic profession.

Board of Trustees—Honorary President: William E. Ritter, University of California. Representing the American Association for the Advancement of Science: J. McKeen Cattell, Editor, *Science*; Henry B. Ward, University of

Illinois; Edwin G. Conklin, President, American Philosophical Society. Representing the National Academy of Sciences: W. H. Howell, Vice-President and Chairman of Executive Committee, Johns Hopkins University; R. A. Millikan, California Institute of Technology; Harlow Shapley, Harvard College Observatory. Representing National Research Council: C. G. Abbott, Secretary, Smithsonian Institution; Harrison E. Howe, Editor, Industrial and Engineering Chemistry; Ross G. Harrison, Yale University. Representing Journalistic Profession: John H. Finley, Editor, New York Times; J. Edwin Murphy, Managing Editor, Baltimore Evening Sun; O. W. Riegel, Washington and Lee School of Journalism. Representing E. W. Scripps Estate: Harry L. Smithson, Treasurer, Cincinnati, Ohio; Warren S. Thompson, Miami University, Oxford, Ohio; W. W. Hawkins, Scripps Howard Newspapers.

Staff—Director, Watson Davis; Writers, Frank Thone, Emily C. Davis, Jane Stafford, Marjorie Van de Water, Robert Potter, Leonard H. Engel; Correspondents in principal cities and centers of research. Photography: Fremont Davis; Librarian: Minna Gill; Sales and Advertising: Hallie Jenkins, Austin Winant, Howard Bandy.

ENTOMOLOGY—PHOTOGRAPHY

# Ultra-Fast Wing Beats Of Insects Discovered

## Using Exposures of One Twenty-Five-Thousandth of Second; Almost Incredible Speeds Are Recorded

See Front Cover

**S**TUDIES of the almost incredibly fast beatings of insect wings, in some cases as high as 350 strokes per second, are in progress at Harvard's Biological Laboratories as the first step in a comprehensive research program aimed at understanding the physiological processes which sustain this exceptionally vigorous activity.

The investigation, directed by Dr. Leigh E. Chadwick, is aided by the high speed stroboscopic and photographic technique perfected by Prof. Harold E. Edgerton of the Massachusetts Institute of Technology. With exposures as fast as a 25,000th of a second, sharp, stop-action photographs can be obtained of the whirling wings of the insects can be observed visually, either stopped altogether, at slow motion or even in reverse.

Outstanding among Dr. Chadwick's preliminary findings is the first conclusive answer to an old scientific argument, whether the speed of the wing beat varies among species, among individuals of the same species or even in the same individual under different external conditions. Dr. Chadwick finds there is considerable variation in all of these cases.

Different individuals of his most useful subject, *drosophila* the fruit fly, which has already made such tremendous contributions to the science of genetics, for example, vary in wing speed from about 9000 beats per minute to possibly 13,000 under normal conditions. Increasing temperatures skyrocket the rate from 6000 at 50° Fahrenheit (10° Centigrade) to double that at 84° F. (29° C.).

### Fatigue Slows

Fatigue naturally lowers the rate, even at high temperatures, but the fruit fly can usually manage two or three hundred thousand strokes before exhaustion.

Wing speeds of moths and butterflies also vary widely among different species. The common big yellow swallowtails, for example, average about six beats a second while hawk moth speeds run as high as 90 per second. The honey bee averages between 160 and 220 per second, the

bumblebee, 240, and the common house fly about 160. Dragon flies, at 30 per second, have the peculiarity that the rear set of wings precedes the front set in the beating, in contrast to the case for other types of insects.

To appreciate these tremendous speeds, compare them with high-speed physical exercises of other animals: man can do a fast one-finger piano trill at about 10 beats per second; the leg of a scratching mouse does about 20 per second; the wings of a hummingbird, much too rapid to be seen, go about 50 beats per second.

Dr. Chadwick is also studying the effects of atmospheric pressure on wing-

speeds and correlating his findings with oxygen consumption as a clue to internal physiological activity. Associated with him in the study are three research students, Carroll M. Williams, Darcy Gilmour, and O. P. Pearson.

Science News Letter, August 5, 1939

MEDICINE

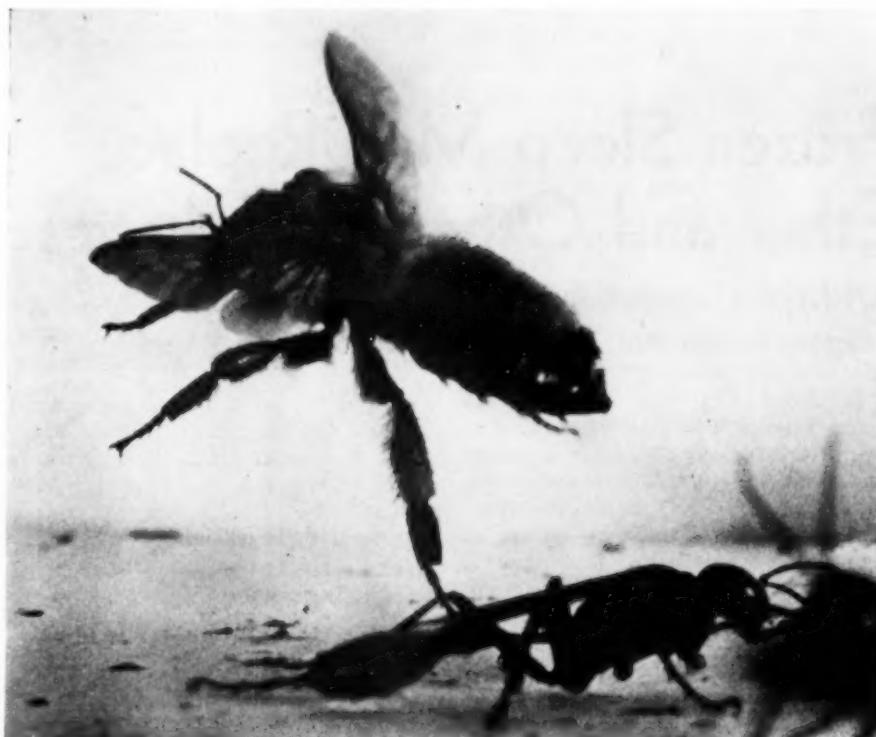
## Report Rabbit Fever Cure By Sulfanilamide

**T**ULAREMIA (rabbit fever) has been successfully treated with sulfanilamide, Dr. Walker L. Curtis of College Park, Ga., reports. (*Journal, American Medical Association*, July 22)

This apparently is the first reported case of the use of this outstanding new drug in fighting the infection that comes from handling infected rabbits.

Mice infected with tularemia germs were not helped by sulfanilamide in studies made at the U. S. National Institute of Health, Dr. Edward Francis, replied to an inquiry by Science Service.

Science News Letter, August 5, 1939



TAKING OFF

Scientific high speed photography at Harvard University by Dr. Leigh E. Chadwick now makes possible the study of the almost incredibly fast beating of insect wings. Above, a bumble bee takes off for flight, giving a last upward kick with its hind leg. Its wing beats occur at the rate of 240 a second. A wasp sits at the bottom right. Exposure time 1/25,000 of a second. On the cover of this week's SCIENCE NEWS LETTER is shown a cicada with wings beating 45 times a second "stopped" near the bottom of the down stroke.

## ASTRONOMY

# Great Stellar Catastrophe Found in Photographic Plates

**Supernova Found On Picture Taken in December, 1937; Explosion Actually Happened Millions of Years Ago**

**A**GIGANTIC exploding star or supernova, the greatest cosmic catastrophe known, has been discovered on photographic plates of the Harvard Observatory by Miss Rebecca Jones, of the Observatory staff. These stupendous phenomena are quite rare heavenly spectacles, only about 30 having been found previously.

This is the second supernova ever found on Harvard plates, Miss Constance Boyd of the Observatory staff having found the first just a year ago. The new supernova was found on a plate taken Dec. 9, 1937, with the 16-inch Metcalf telescope at Harvard's Oak Ridge station in a routine search for far off island universes.

At that time it was of the 16th magnitude, well beyond range of the naked eye.

True to the habits of supernova, it flared quickly, probably reaching a magnitude of 13.5 or brighter within two or three days. It was last photographed on a plate exposed March 6, 1937.

Actually, the explosion happened millions of years ago as it takes light that long to reach us.

The supernova, associated with a spiral nebula just below the pointers of the Big Dipper, is technically a "dead" body, that is, it cannot be photographed now since it has faded beyond range of modern instruments and all knowledge of it must come from a study of plates on which it accidentally appeared.

Its position is right ascension 10 hours, 22.2 minutes, declination plus 41 degrees, 55 minutes and the associated nebula is new general catalogue 3184.

*Science News Letter, August 5, 1939*

four degrees below its normal temperature of 98.6 degrees Fahrenheit.

Of the many scientists whose interest was aroused by reports of this use of frozen sleep, Dr. Parker is apparently the first to go on record with a practical suggestion for its use in fields other than cancer treatment.

The Harvard method of inducing frozen sleep, as Dr. Parker describes it, is similar to that used by the Philadelphia doctors on cancer patients. At Harvard the fishes or reptiles are immersed for 10 to 15 minutes in water and cracked ice or cracked ice alone. They are then laid on cracked ice for the operation.

The Philadelphia doctors put their patients in a room cooled to about 50 degrees Fahrenheit, used an air-conditioning unit to keep the body temperature below 95 degrees Fahrenheit, and surrounded the patients with ice bags and coils in which ice water circulates. The patients were kept in this frozen sleep for several days. Before turning on the cold, however, the patients were put to sleep with sleeping medicines.

The animals at Harvard, Dr. Parker says, recover quickly and satisfactorily from their frozen sleep at the ordinary temperature of the laboratory and "the animals so treated may be almost at once tested in a particular way without waiting for the gradual disappearance from their systems of an anesthetizing drug."

*Science News Letter, August 5, 1939*

## MEDICINE

# Frozen Sleep May Replace Ether and Other Anesthetics

**Artificial Hibernation Tried Successfully For Surgery on Animals at Harvard; Recovery Is Rapid**

**F**RZEN SLEEP may replace ether as anesthetic for surgical operations of the future. Instead of putting a smelly mask over the patient's face and telling him to "breathe deep" the surgeon of tomorrow may gently chill his patient to insensibility before getting to work with scalpel and needles. After the operation is over, the patient will be warmed back to consciousness without any unpleasant anesthetic after-effects.

Scientific evidence that this picture of future surgical operations is a distinct possibility appears in a report from Dr. G. H. Parker, Harvard University emeritus professor of zoology. (*Science*, July 21) Frozen sleep has long been used in the Harvard laboratories for operations, even extensive ones, on fishes, amphibians and reptiles, Dr. Parker tells fellow scientists.

Use of the same method of inducing unconsciousness before operations on humans is suggested, Dr. Parker says, by "press reports of a kind of cold hibernation induced in human beings by a slight lowering of their bodily temperatures."

This refers to the use of cold hibernation in treatment of inoperable cancer reported by Drs. Temple Fay and Lawrence W. Smith, of Temple University, Philadelphia, to the American Association for Cancer Research and the American Medical Association in April and May of this year. Without advocating the method as a cancer cure, but only as an aid in treatment, the Philadelphia physicians aroused the interest of fellow scientists by their achievement of safe hibernation in humans through refrigeration methods which cooled the body three to

## MEDICINE

# New Cause of Backache Discovered In Ligaments

**A** NEW cause of backache has been discovered by Dr. H. B. Macey of the Mayo Clinic. Changes in certain ligaments of the spine, Dr. Macey believes, cause the localized, persistent pain which does not get better with usual methods of treatment for backache.

Operation at which the affected ligaments are removed relieves the pain immediately, Dr. Macey reports. One 29-year-old woman who had had backache for five years following the birth of a child was leading a perfectly normal active life without any return of the pain three months after the operation.

Dr. Macey says the condition has not, so far as he knows, been described before. He expects to report further on this apparently new cause of backache and its relief after more time has elapsed in which to observe the patients who have had the operation.

*Science News Letter, August 5, 1939*



#### ARTIFICIAL HEART

The Lindbergh-Carrel heart on exhibit at the New York Worlds Fair. Viewing the apparatus with Dr. Carrel (extreme right) are officials of the Ciba Pharmaceutical Products Co., in charge of the exhibit.

#### MEDICINE

## Lindbergh-Carrel Heart Gives New Lead For Graves' Disease

### Study of Thyroid Glands Removed From Patients With Disease Point to Condition Outside Gland

**A** NEW lead for an attack on the kind of goiter known as Graves' disease has been obtained from human thyroid glands kept alive on artificial medium outside the body for the first time for from three weeks to two months in the Lindbergh-Carrel heart apparatus.

The studies, if they can be continued, may revolutionize the treatment of this kind of goiter, characterized by popping eyes. They are reported by Drs. N. Chandler Foot, Lillian E. Baker and Alexis Carrel, of the Rockefeller Institute for Medical Research and Cornell University Medical College and New York Hospital. (*Journal of Experimental Medicine*, July 1)

The thyroid glands were taken from patients operated on for Graves' disease. The glands were immediately placed in fruit jars, the covers were clamped on, the jars wrapped in sterile cotton, and then whisked from the hospital to the neighboring Rockefeller Institute. There the glands, after preliminary treatment, were placed in the apparatus designed for Dr. Carrel by Col. Charles E. Lindbergh. They were nourished on solutions or media instead of blood. Different kinds of

solutions were tried, but the glands, it was found, could be kept alive and healthy for weeks on a completely artificial, synthetic solution which contained only a tiny amount of blood serum, just enough to act as a solvent for vitamin A.

A remarkable cancer-like change occurred in one of the glands during the six to eight weeks that it remained in the apparatus. The change was great enough to deceive a competent thyroid surgeon who examined sections of this gland into thinking the sections were from cancer tissue. No reason for this change was found, and after about one month, the gland became more normal looking.

A hint that the serious thyroid gland disorder, Graves' disease, may be due to some condition quite outside the gland was found in studies of the human glands in the Lindbergh-Carrel apparatus. The changes in the gland that appear in Graves' disease were increased and intensified when small amounts of extracts from the cortex of the adrenal glands and from the pituitary gland were added to the nourishing solution on which the glands lived in the Lindbergh-Carrel heart. Thyroid gland hormone itself, fe-

male sex hormone material, adrenalin, and insulin were also tried, but produced changes only in connection with the adrenal cortex hormone and the pituitary hormone.

"It is too early to say whether Graves' disease is a matter of something other than the thyroid gland," Dr. Baker declared in response to a Science Service inquiry.

At present she is more concerned with the fact that human organs can be kept alive for long periods in the apparatus.

"Now the time is ripe for further investigation," she said. She indicated that such investigations would be continued both on thyroid glands and other organs "if facilities permit."

One of the great advantages of the method is that the organs can be kept alive on artificial media for long periods, during which the effect of the continuous action of small amounts of gland extracts and other chemicals can be studied.

"Such experiments are probably of the utmost importance," Drs. Baker and Carrel state, "since this may be the way that certain profound changes are produced within the body."

*Science News Letter, August 5, 1939*

#### AERONAUTICS

### U. S. Army Air Corps Looks Back At 30 Years

**T**HE UNITED STATES Army Air Corps, oldest military flying force in the world, looked back on 30 years of progress August 2, the anniversary of its birth.

With one of the first five Army men to learn to fly, General Henry H. (Hap) Arnold, as their present commander, Air Corps officers could make this comparison:

Their first plane, built by the Wright Brothers and accepted by the War Department on Aug. 2, 1909, had a top speed of 47 miles an hour. It weighed 800 pounds. It could stay aloft more than an hour with two men.

Their latest embrace a score of types. Fastest are the experimental twin-engined Lockheed pursuit and the Bell interceptor, nicknamed the "cigar on a tricycle." Each has a top speed in the neighborhood of 420 miles an hour. Largest is the B-15, the "super flying fortress," whose gross weight is 35 tons. Under construction is a still larger craft whose range, with a load of several tons of bombs, will be 10,000 miles. Available to the Air Corps is a passenger plane which could transport upwards of 50 men at a time.

*Science News Letter, August 5, 1939*

## ASTRONOMY

# Michigan Astronomer Sketches All Sides of Planet Mars

**Drawings Show Markings That Have Been Called Canals And Patches That Change Color With Changing Seasons**

By PROF. DEAN B. McLAUGHLIN  
University of Michigan Observatory

THE appearance of the planet Mars, now making a close approach to the earth, is shown in the accompanying sketches. They show the way the planet looks during a complete rotation.

Since the rotation period of Mars is only 37 minutes longer than that of the earth, it is necessary to select drawings made over an interval of about a month to show a full rotation. For the same reason, it happens that the sketches run backward in time,—that is, when arranged in the order in which the features would appear in the course of a rotation of Mars, the features which would come into view later were observed on an earlier calendar date.

The main features shown are:

The south polar cap is represented in the sketches as white. It is at the top, since the telescope gives an inverted image. This feature is believed to be snow, since it grows and shrinks with the progress of the seasons on Mars. Of course, carbon dioxide snow has been suggested, but measures of the temperature of Mars now seem to favor the hypothesis that it is snow formed from water. At present the cap is of intermediate size. It has shown some shrinkage during the past several weeks, but it still is due to shrink to much smaller size during the next couple of months.

The general light-colored surface of the planet appears reddish in the telescope, and is represented as very light gray in the sketches. Its color remains

the same at all seasons, and it is believed to be desert. The reddish color would be due to high iron oxide content of the surface rocks or sand.

The dark areas appear grayish or greenish-gray in the telescope, and are represented in the sketches by various shades of gray darker than the general surface of the planet. The time interval covered by the sketches is not sufficient to show any of the strong seasonal changes which occur in these markings. They get darker and greener during the Martian summer, and become a dead brownish color and fade out in the winter. This has suggested the hypothesis that they represent the growth of vegetation,—a very plausible interpretation.

The most conspicuous of these dark markings is the Syrtis Major, which appears on the first three sketches. One of the most striking, though it is small, is the "forked bay" (center of sketch at extreme right of row on this page) which appears very dark when it is in good position. There are several faint lightish streaks across some of the dark areas. Their brightness is not so high as that of the general surface of the planet, but their color is similar to it.

There are some "islands" of light color in the dark. One of these, called Hellas, was particularly subject to frosts several weeks ago. When that area first appeared from the night side of the planet it was bright like the polar cap, but in a couple of hours it would change to the same dull color as the rest of the surface, due to the disappearance of the frost as the sun rose. The season of frosts in Hellas is

now past,—it has been of just ordinary brightness recently.

One feature of interest about the dark areas is the evidence they furnish of the existence of an atmosphere about Mars. When a very dark patch like the Syrtis Major is close to the edge of the disk, it does not appear at all as dark as when it is near the center of the disk. This is due to scattering of light by the greater thickness of atmosphere in the line of sight when one views the edge of the disk.

## 200 Miles Wide

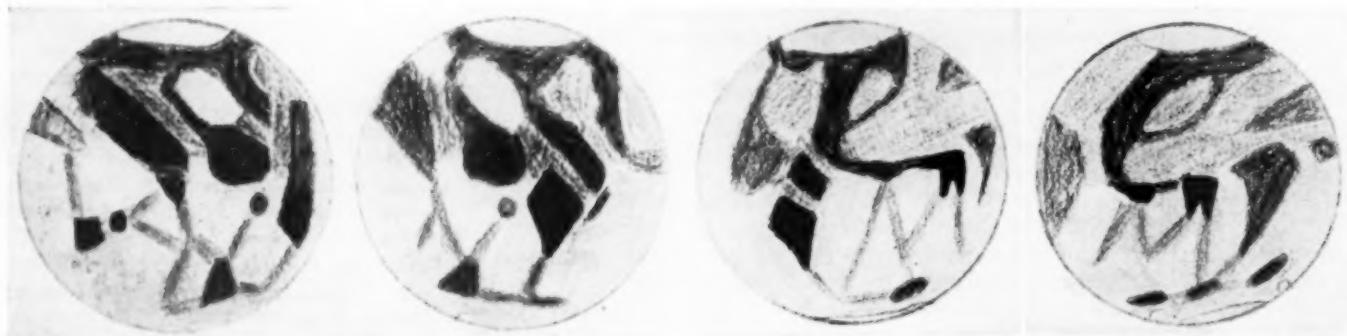
The canals are represented on the sketches as diffuse grayish streaks. At the telescope they appeared about as wide as they are drawn. I have not seen any narrow fine lines at all. It should be borne in mind that the canals shown on the drawings have widths of *a couple of hundred miles*.

It cannot be denied that there is *something* there. The canals are positively not, as some claimed in past years, purely a figment of the imagination. This statement of their reality, however, must not be taken as implying that they are really of the same nature as the drawing would indicate.

The drawings show the way they *appeared* to the observer. They appeared similarly to a couple of other observers who viewed the planet and recorded them without consulting me at all. But such agreement between observers may mean simply that most human beings

## MARS' MARKINGS

*The sketches here and on the facing page were made by Prof. Dean B. McLaughlin, University of Michigan astronomer and show all sides of the planet Mars, now making a close approach to the earth. Because the Martian day is only slightly longer than the rotation of the earth's 24 hours, sketches of a whole rotation of our neighbor planet had to be made over a month's time. Times of observations are as follows, left to right: July 19, 12:30 a. m.; July 19, 2:35 a. m.; July 11, 1:20 a. m.; July 7, 12:50 a. m.*





are constituted alike, so that they see things alike.

It is distinctly possible that the canals are not long and approximately straight streaks, but simply a result of the running together of fine details which are beyond the powers of resolution of the instrument.

It is possible that *some* of them are actually long streak-like areas. For instance, a mountain chain eroded down until it presented rather low relief (lower than that of the present Appalachians) might appear to an observer 36,000,000 miles away as a long and roughly straight streak. Likewise, a broad river valley with its border of vegetation (The Mississippi or Amazon!!) might appear as a long and roughly straight streak. I do not wish to imply that there are either mountains or rivers on Mars, but I do wish to state emphatically that the idea of actual irrigation canals appears to me absurd. This is, of course, simply a personal opinion, and is not capable of proof at the present time, and perhaps the less said about it the better.

These drawings cannot compete with

observations made by Mars experts with larger instruments. I am not a Mars expert, but only a beginner so far as Mars is concerned, working with a 10-inch and a 12-inch refractor. The far southern position of the planet is an additional handicap, since it means that one must view it through a great thickness of the earth's atmosphere. So these observations are definitely in the amateur class. However, they are of interest as indicating what a non-expert with a telescope of only moderate size can see on Mars at this opposition.

One of the surprises in connection with these observations was the ease with which some of the most conspicuous canals can be seen. But possibly a larger instrument would resolve the fine detail and the appearance of linear streaks would then vanish. In fact, during occasional moments of very good seeing, I have suspected the beginning of such resolution,—there has been the fleeting impression that what I saw as a broad streak was actually a very intricate mass of detail just beyond the resolving power of the instrument.

*Science News Letter, August 5, 1939*

#### SEEN BY ASTRONOMER

These drawings complete the series shown on the facing page. Left to right: July 7, 3:10 a.m.; July 2, 3:45 a.m.; June 26, 2:30 a.m.; June 25, 4:15 a.m. All times are Eastern Standard.

the land on which they live is below sea level and is also in the river's way.

"There is little hope that the river can be returned to the bed from which it so recently fled," Mr. Hanwell declared. "On former occasions efforts to force the river back to its 'proper' bed were under way long before it was able to form a definite new channel of its own. In addition, those charged with the responsibility of controlling the rampant river had certain facilities at hand which are no longer available. Access to transportation facilities and materials necessary for curbing the river are now cut off by the war. The most serious breach remains, it is reported, in the 'no man's land' between the Japanese and Chinese 'lines'. So long as hostilities continue . . . it appears unlikely that effective countermeasures can or will be taken to avert an otherwise almost inevitable catastrophe."

Last year the Yellow River caused enormous destruction when it changed its course, usurped the beds of two other rivers and ended up by flowing through the Grand Canal into the Yangtze River. The Yangtze, itself in flood due to melting western China snows and dykes cut by fighting armies, backed up and overflowed Lake Poyang as a result.

*Science News Letter, August 5, 1939*

#### GEOGRAPHY

## Yellow River Flood Will Be More Damaging Than War

**Transportation and Other Facilities Necessary for Control Said To Be Cut Off by War; Millions Affected**

THE TREACHEROUS, silt-laden Yellow River, "China's Sorrow," will go on a flood rampage in a few weeks in the no man's land between contending Japanese armies and Chinese guerrillas which will exceed the war itself in destructiveness, Norman D. Hanwell of the American Council of the Institute of Pacific Relations, predicted.

The river's new course, which it carved out for itself last year in one of its periodic shifts, is too small to take care of the flow of water from summer rains, he said.

Twelve million people in the province of Kiangsu, in one corner of which Shanghai is located, will eventually be dispossessed and forced to move because

## RADIO

Dr. Henry B. Allen, director and secretary of historic Franklin Institute, will be the guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Monday, August 14, 5:45 EDST, 4:45 EST, 3:45 CST, 2:45 MST, 1:45 PST. Listen in on your local station. Listen in each Monday.

## EXPLORATION

**Eskimos Making Garments For Antarctic Expedition**

**A**LASKAN Eskimos have already been set to work by the Division of Arts and Crafts of the Office of Indian Affairs making mukluks—reindeer fur boots—and parkas or fur hoods for members of the forthcoming U. S. Antarctic Expedition. Sailmakers in Boston are also at work on clothing made of tight-woven cotton airplane fabric which is both wind resistant and light in weight, the Antarctic Service, which is organizing the expedition, said.

The Eskimos are being paid for their work out of funds for the expedition. The Indian Office regularly employs them in making similar garments.

Other clothing for the expedition will come from War Department stocks or will be bought from the open market, it was stated. Leather ski boots are to be used for traveling. The men will all wear long flannel underwear during the entire year they are in the Antarctic.

*Science News Letter, August 5, 1939*

## PSYCHOLOGY

**Sound of Mother's Laugh Baby's First Music Lesson**

**H**ARASSED mothers who interfere when small Johnny bangs on his tray or kicks the parlor table are discouraging the musical development of their sons, warns an expert on the psychology of music, Dr. Carl E. Seashore, of the University of Iowa.

They do not realize that banging is music to the child under five.

A child is not unmusical because he does not understand the artistic singing or playing of a talented mother. He must be musical in response to his own environment.

"To the primitive tribe, the drum is a powerful, thrilling musical instrument," explains Dr. Seashore in a University of Iowa Child Welfare Pamphlet. "So are all forms of drumming to the child. He imitates the whistling, tooting, rattling, banging sounds in his environment, sometimes until he becomes noisily tiresome. He feels in harmony with the clock that ticks, the birds that sing, the dog that barks, the cat that mews. He loves to bang on the piano and blow his horn."

Baby's first music lesson is his mother's laugh as they play together.

When he learns to play with this sound himself he has come to the be-

ginning of singing and appreciation of music. When he gurgles and goes, playing with modulations in pitch, in loudness, in duration and different kinds of tone quality—that is the beginning of musical creation, of composition.

Nursery music education goes on when baby learns to patty-cake, to wave his rattle, to jingle his bells.

The first formal lessons take place when he is taught to speak. For speech has the same art as music and beautiful speech is the first step in attaining a beautiful singing voice.

Let the baby hear musical speech—no scolding, harsh, unmodulated voices. No discordant jangling of noisy arguments.

But if the mother cannot speak or sing beautifully, she need not be discouraged in an attempt to help her child. More important than the example of beautiful sound is the encouragement of a sympathetic audience.

"The mother's first task," said Dr. Seashore, "is to be a good listener."

*Science News Letter, August 5, 1939*

## MEDICINE

**Faster Night Cell Growth Suggests New Cancer Lead**

**A** NEW lead on that disastrous condition of uncontrolled and rapid cell growth, cancer, is suggested by the discovery that some cells of the body grow about twice as fast by night as by day.

The discovery of the day and night rhythm of cell growth by division was made by Drs. A. C. Broders and W. B. Dublin, of the Mayo Foundation.

Cells of human skin, removed at different hours during the day and night, were the subject of their study. The cells, they found, divided into new cells about twice as often at night as during the day. This diurnal rhythm of cell division may occur throughout the body, and perhaps even in tumors, the Mayo scientists point out, although they add that cancers need not conform to any laws governing normal, well-differentiated tissue.

Cancers of both humans and animals should be investigated with this growth rhythm in mind, they suggest.

The increase in cell division at night is explained as follows:

"It appears that during the day, the emphasis lies on work, digestion, respiration and other processes of like nature, and that during the night, when need for these functions is diminished, attention is turned toward repairing rundown tissues and building new ones."

*Science News Letter, August 5, 1939*

## IN SCIENCE

## CHEMISTRY

**Common Raw Materials Give Important Chemicals**

**T**HE WORLD'S most important industrial chemicals are made from a small group of mineral raw materials, although the production of a single chemical may require an amazingly large number of other chemicals, processes and raw materials.

If the chemist were given three wishes, as in the fairy tale, he would pick these groups of raw materials: 1. Coal, petroleum and natural gas. 2. Sulfur and sulfide ores. 3. Salt, brines and sea water. For these, with limestone, air and water are most frequently used in manufacturing our chemical civilization.

Drs. R. N. Keller and T. T. Quirke at the University of Illinois have been looking into the source of 150 important industrial chemicals, ranging alphabetically from acetanilide to zinc sulfate. They can be traced to 34 raw materials.

Take ammonia, for instance. It and the materials used in its manufacture include ammonia liquors, nitrogen, hydrogen, calcium cyanamide, catalysts and catalyst supports, peat, bones, animal refuse, sugar beets, etc. Ammonia liquors come from coal gas which comes from coal. Nitrogen comes from the air, hydrogen from water. In fact, all the ammonia sources can thus be traced back to air, water, coal and limestone.

This digging back into origins is not just an academic exercise. It may very well aid a producer or owner of some raw material to plan manufacturing and distribution of a product. Since transportation of heavy raw materials is costly, intelligent knowledge of what is needed ultimately to produce a product may allow shifting of industrial plants to more advantageous locations.

Water and air are most frequently used ultimate geologic raw materials, used 99 and 96 times in the case of the 150 chemicals. Next in order are coal, 91; sulfur, 88; mineral salt, 75; limestone, 63; sulfide ores, 32; brines, 24; petroleum, 23; natural gas, 16; salt peter, 13; potassium minerals, 11; gypsum, 10. The other 21 raw materials are used less than 10 times each.

*Science News Letter, August 5, 1939*

## SCIENCE FIELDS

## ICHTHYOLOGY

**Fear Dams Will Harm Our Migratory Fish**

**C**URRENT fish stories:

The Western Division of the American Society of Ichthyologists and Herpetologists and the Western Society of Naturalists, in convention assembled, fearful that Bonneville, Grand Coulee and other dams will harm migratory fish such as salmon and steelhead trout, ask that fisheries surveys be conducted for five years, or for a period covering life cycles of any economically important fish, before starting construction of dams or any structure interfering with fish spawning runs.

A new research vessel of the U. S. Bureau of Fisheries will go down to the Atlantic Ocean early next year. It may allow prediction of future sea crops of cod, haddock, flounder and redfish.

The possibility of putting the Alaska fisheries industry on year-round basis is another U. S. project. Now cannery equipment there is idle for large portion of the year.

*Science News Letter, August 5, 1939*

## ENGINEERING

**Super-Highways Across U. S. Impractical, Say Experts**

**N**OT FOR many years, if ever, will America's highway map include super-transcontinental roadways that would make trips from New York to San Francisco a speedy, enjoyable trip through a virtual parkway. Dreams of such highways—to be financed by tolls for their use—have fallen before actual facts assembled by the U. S. Bureau of Public Roads.

Only a small portion of the present traffic on American highways could be attracted to these super-systems, states a report prepared by government experts on highways.

Transcontinental tourists would certainly like the roads, it is agreed, but how many such tourists do you think are travelling daily on an average basis? Take a guess.

Counts made on east-west highways at checking stations established from Canada to Mexico show that only 300

passenger vehicles crossed this north-south line daily in transcontinental travel.

The upkeep of super-highways would be based on tolls which have been estimated to be about one cent per vehicle mile for passenger cars and 3.5 cents a mile for trucks and busses.

However, on a cost basis, the Bureau of Public Roads finds that estimated tolls for the six super-roadways planned would come out to be about \$100,000,000 less each year than the estimated cost of maintaining them. The building cost for the total of 14,336 miles of super-highways would be nearly three billion dollars.

Only on one stretch of the proposed highways would conditions appear to be self-supporting. This is the 172-mile highway which would link Philadelphia, Pa., and New Haven, Conn., and tap a dense population area. By 1960 this section of super-highway might break even.

The great need of today's traffic problem, feel the Federal experts, are express highways that will cut directly into the centers of large cities. Traffic maps show that 90 per cent of all traffic on main highways near cities is bound for the heart of the city. Such vehicles cannot use by-pass routes even if they exist.

*Science News Letter, August 5, 1939*

## MEDICINE

**Specific Chemical Remedies Predicted For Most Diseases**

**S**PECIFIC chemical remedies, such as sulfanilamide, will be available in the future for practically all of the common infectious or germ diseases, Dr. E. H. Northey, of the Calco Chemical Company, predicted at a special research conference of chemists at Gibson Island, Md.

Sulfanilamide itself and its derivatives, he said, have proved successful against a wide variety of diseases of bacterial origin, including blood poisoning, abscesses and sore throats where they are caused by streptococci; the venereal diseases, gonorrhea and chancroid; meningitis; erysipelas; and, most important from the viewpoint of mortality, pneumonia.

Chemicals derived from sulfanilamide now under test show promise of value, Dr. Northey said, against tuberculosis and virus diseases, the latter being the group which includes infantile paralysis and influenza.

Sulfanilamide derivatives reported by chemists working to produce new and better chemical remedies of this sort now total 778, Dr. Northey reported.

*Science News Letter, August 5, 1939*

## MEDICINE

**New Purified Antitoxin For Diphtheria Developed**

**A** NEW highly purified diphtheria antitoxin, developed in England, is reported in the *Journal of the American Medical Association*. (July 22)

Animal experiments indicate that this refined antitoxin is more rapidly and completely absorbed from subcutaneous tissues than is the American antitoxin.

The Wellcome Laboratories, England, have developed a method of large scale purification of diphtheria antitoxin based on a fractional enzymic action.

"The possibility that such enzyme purifications may be generally applicable to antisera demands prompt investigation," declares the *Journal*.

*Science News Letter, August 5, 1939*

## FORESTRY

**Forest Fire Situation Considered Very Serious**

**F**ROM the Fire Control Division of the U. S. Forest Service in Washington comes this bird's-eye picture of the nation's forest fires. Total number of fires in National Forests and land under forest service protection through July 20 was 6,405 while for the same period in 1938 the number was only 6,379 and the five-year average is 6,195.

Prolonged hot dry weather over the Rocky Mountain region has made this area the biggest 1939 danger spot. Fires in this region total 286 so far, while a year ago, in the same period, there were only 99 and the five year average is 146.

Key danger spot in all the country is Colorado where Roy Headley, chief of the fire control division of the U. S. Forest Service, is now making temporary headquarters. Typical of the situation was Denver's 61-year record temperature of 102 degrees coupled with only seven per cent. humidity.

An analysis of the 6,405 fires so far reported for 1939 shows that 70 per cent. of them are of man-made origin. The remainder are caused by lightning. The latter, however, cause most of the fire fighters' headaches for they occur many times in very inaccessible regions, whereas man-made fires commonly are started along trails and mountain roads where men and equipment can be hurriedly called to fight them. Toughest of this year's fires has been the "McVey" blaze in the Black Hills of South Dakota which started July 10 and swept 20,000 acres before being put under control.

*Science News Letter, August 5, 1939*

MEDICINE—BIOLOGY

# Hay Fever Time

## Since Most Hay Fever Is Due to Two Ragweeds, Their Blooming Is a Signal for Sneezes

By DR. FRANK THONE

**D**O YOU have hay fever? Are you one of those luckless millions of Americans whose sneezes are now beginning to mount into the crashing crescendo that comes every year in late

If you are, or if you have hay fever victims among your kinsfolk or acquaintances, you have cause to indulge in the unconsoling reflection that as an average American citizen you helped to bring it upon yourself. You asked for it!

Connection between current American civilization and the spread of hay fever is set forth by Dr. R. P. Wodehouse, scientific director of the Arlington Chemical Company's hay fever laboratory at Yonkers, N. Y., in the magazine *Natural History*.

Most hay fever is due to the two commonest species of ragweed, together with a few equally disreputable relatives. In earlier days on this continent, ragweeds were not at all abundant. They could find place to grow only where floods had laid a layer of mud on the river-bottoms, or where a landslip or gully left a stretch of bare, raw earth. Ragweeds then went in as members of the first wave of pioneer vegetation; they could even fairly be counted as first-aid plants, initiating the process of healing up these wounds in the soil.

### Weeds Grow Rank

But civilization has made the land of this continent very sick. In our eagerness to get all the money we can in the shortest possible time, we Americans have over-plowed, over-grazed, over-lumbered our heritage. We have almost skinned poor Mother Earth alive; she is covered with wounds of our making. And the ragweeds and other bearers of hay fever pollens have multiplied a million-fold. They grow thick and rank where they used to be but thin and scattered. Their hordes increase year by year, and with them the clouds of pollen they pour into the air. We are paying through the nose, in a painfully literal sense, for the way we have over-exploited America's land.

There are a number of species of

ragweeds, but only two of them figure really importantly in the mass production of sneezes and reddened eyes. They are known respectively as the tall or giant ragweed and the low or dwarf ragweed. The tall ragweed grows from three or four to 16 or 18 feet high; it is a stout, coarse, hairy plant, with its broad, rough leaves divided into three blunt lobes. The low ragweed seldom grows more than four feet high; its rank-smelling leaves are finely divided, somewhat like those of carrots.

### Wind Carried

Both species produce immense quantities of pollen. They belong to that large and miscellaneous group of plants that are not visited by insects but depend on the wind to carry their pollen for them. Naturally, this wasteful, hit-or-miss method of pollination requires vastly more of the fertilizing dust than is needed by the more economical insect-pollinated plants.

Wind-borne pollens can be carried to great heights in the air and often travel long distances. Oren C. Durham, chief

botanist of the Abbott Laboratories in North Chicago, has made many airplane flights to study the vertical distribution of ragweed and other pollens. He has found the pestiferous sneeze-dusts in quantity at altitudes of 9,000 feet and above.

### "Skyhook"

In collecting pollen during high-altitude flights, a device called colloquially a "skyhook" is used. The original skyhook was invented by Col. Lindbergh, for some scientists who wanted to comb the upper air for bacteria and the spores of fungi. It holds a small plate of glass, made sticky with glycerin or other appropriate chemical substance, and exposes it for any number of minutes the operator desires as the plane flies along. Then the glass slide is taken out for laboratory examination, and a fresh one inserted in its place.

Mr. Durham now uses an improved, streamlined skyhook, more convenient to operate than the original model. It attaches very easily to the sliding window at the side of the pilot's cabin in the modern airliners. It may be that future routine in airline duty will include taking samples of the micro-population of the air, just as present-day ocean liners regularly take echo-sound-



RAGWEED

Here are shown the two common varieties of ragweed. The giant kind does not belie its name; these towering weeds (left) are less than average height. If the young lady on the right were pollen sensitive, she wouldn't be sticking her nose into low ragweed this way.

ings of the bottom over which they are passing. In any case, Mr. Durham's studies are yielding scientifically valuable data on hay fever pollens and how they get about the country.

### Pollen Census

Pollens down at the levels where most of us live and breathe and do our sneezing have also been made the subject of systematic study by Mr. Durham, with the cooperation of the Weather Bureau, the Works Progress Administration and other government agencies. Pollen-catching plates have been exposed in a number of cities at strategic points over the country during the hay fever season, and yearly "pollen censuses" obtained.

One thing that these urban pollen collections have emphatically established: Even the streets and buildings farthest from weedy fields and roadsides are by no means pollen-free. The light invisible dust can be carried for miles, to the very heart of the most desert metropolis.

Of course, cities do not necessarily depend on the country for their supply of hay fever pollens. They grow a great deal of their own. City dumps, neglected empty lots, the "jungles" among the railroad yards and river bottoms, even parks and playgrounds that are not well kept up, all offer ideal conditions for the growth of the ragweeds and their disreputable cousins and allies like cocklebur, marsh elder and Russian thistle.

Sporadic clean-ups, when weed gangs are sent out to scythe down unkempt vacant lots, as a rule leave untouched the heavier masses of ragweed on the dumps and along the railroad tracks. Only the poor and uninfluential ever see these eyesores, so the city fathers can afford to neglect them and thus pare the budget a little. But the pollen clouds from the wrong side of the tracks can and do cause sneezes and misery on the porch of the Country Club.

Just scything down the pollen-bearing weeds is no cure for the evil, Dr. Wodehouse points out. Indeed, it may have just the opposite effect, resulting in a longer persistence of the ragweed pest. Annual plants like the ragweeds, that spring from seeds and die within a single growing season, ordinarily give way after a few years to longer-lived (perennial) plants. Left to themselves, ragweeds are eventually crowded out, the vegetational cycle ending either in a solid grass sod or a growth of bushes and young trees.

But this presupposes freedom from fresh disturbance or interference. If the



### A SNEEZE

*To the hay fever victim in a paroxysm of sneezing the world is rocked. This is the conception of an Abbott Laboratory artist.*

place is mowed clean once or twice a season, the succession-plants are cut back with the ragweed. If fresh dirt is dumped in, or the existing ground level upset by the blade of a road-grader or the like, everything is set back to the Year One and the reign of the ragweed begins all over again. Better, says Dr. Wodehouse, to let the ragweed alone, unless you take definite steps at the same time to encourage the growth of the permanent vegetation that is to replace it.

### Attractive Substitutes

There are all kinds of attractive perennials that might very appropriately be encouraged to grow along roadsides where now the ragweed reigns. They will bind the soil against erosion and in late summer make the highways gay with their bloom; wild sunflowers, purple coneflower, black-eyed Susan, wild asters, and all the goldenrods.

Against the superstition that goldenrod pollen causes hay fever all botanists rise up in indignant protest. Goldenrod pollen is heavy, sticky, relatively scanty, adapted to insect carriage, not borne on the wind to any distance. For one person caused to sneeze by goldenrod pollen there are tens of thousands whose noses are outraged by the pollen of the ragweeds and other wind-pollinated plants.

People who think that goldenrod causes their hay fever are usually guilty of the type of logical fallacy known as a *non sequitur*: They sneeze, they see goldenrod in bloom, they blame the conspicuous bright flower. And all the while, the real villain of the piece, ragweed, laughs in his inconspicuous green sleeve—and spews more irritating pollen into the air.

The same kind of fallacious thinking happens in spring, when other hay fever victims are suffering from the effects of grass pollens. It happens that roses are in bloom at the same time as these grasses, so that late spring hay fever is often falsely called rose fever. Roses are as little capable of making you sneeze as is goldenrod, but they get the blame nevertheless.

### Hope For Future

For all the cheerless present, there is a good chance that the world of future years will gradually become a better place for hay fever-prone folks to live in.

First, more is known about hay fever and its related allergic phenomena. Doctors can make more accurate tests for your sensitivities, and pharmaceutical manufacturers can supply them with more effective pollen extracts and other curative and preventive materials. And the sneez-



SKYHOOK

Oren C. Durham with the improved streamlined "skyhook" used for collecting pollen grains and other microscopic objects at high altitudes.

ing public at large has become pretty well disillusioned about the quack and patent-medicine "cures" in which some of them once had faith—no small gain in itself, for it leaves the hay fever victim the more disposed to try more promising measures for relief.

Second advance is the development of really effective air filters for use in connection with air-conditioning systems for homes and apartments. Not all air-conditioning systems exclude pollens and road dust—which for some persons is as bad as pollen. However, some of them do, notably the types that run the air through oil-soaked glass wool, or some similar device. It has become possible for hay fever victims who used to flee to the mountains every summer to remain comfortably in the city, if they are willing to remain virtual prisoners in such air-conditioned apartments and offices. Such comfortable imprisonment can hardly be reckoned as real adversary.

Best of all, in the end, is the promise of abatement of the ragweed pest itself. We are becoming more conservation-conscious, and also more aware of possibilities of beauty along our highways. So we are taking active steps to check gullies in fields and pastures with permanent, perennial vegetation, and at the same time our highway authorities are beginning to landscape the roadsides in-

stead of merely keeping them smoothly barbed. Both these processes deprive ragweeds of some of their best homes.

At the same time, the natural re-vegetation of cut-over and burned-over forest areas is slowly driving out great masses of ragweed that moved in when the old-style, cut-clean-and-clear-out lumbermen went away and left smashed deserts behind them. It may be a long time before log-size trees grow in the cut-over lands, but mere thick stands of brush,

such as deer and grouse love to inhabit, are sufficient to suppress the ragweeds. Just the ordinary healing processes of nature, if left to themselves, will in time rehabilitate the one-time hay fever resorts of the old North Woods—and maybe add features attractive to sportsmen later in the season, as well.

This article was edited from manuscript prepared by Science Service for use in illustrated newspaper magazines. Copyright, 1939, by Every Week Magazine and Science Service.

Science News Letter, August 5, 1939

INVENTION

## Rose From Ireland, Cheap Lens Method, Among Patents

AMONG the patents issued recently to inventors by the U. S. Patent Office are:

A new kind of hybrid tea rose from Ireland having vigorous growth and an abundance of white exhibition flowers "softened by a Martius Yellow glow at their bases." (Plant Patent No. 325)

A chemical means of stimulating the buds of deciduous trees to hasten blossoming. (No. 2,166,123)

Method of molding low-cost non-breakable spectacle lenses from thermoplastic transparent materials. (No. 2,166,215)

Methods of producing artificial silk in which finely divided foreign substances are put into the filaments and then partially removed to give a pitted surface having a dull finish. (Nos. 2,166,739-41)

Means of fortifying cereal products with minerals essential to a proper diet. (No. 2,166,797)

An electrical circuit that makes windows close automatically when it rains. (No. 2,166,481)

From Germany, a new type of pneumatic tire having a myriad of tiny interconnected cells which are inflated so that, when a puncture occurs, the air leaks from them slowly and gives a temporary auxiliary cushion. (No. 2,166,511)

A new kind of ice formed by the addition of a small amount of benzoic acid which imparts non-cracking characteristics to the ice. (No. 2,166,113)

New type bath tub in which a shower may be taken while in a sitting position. (No. 2,166,469)

Japanese method of making aluminum

alloys having better forging properties. (Nos. 2,166,495 and 2,166,496)

Airplane with folding wings. (No. 2,166,564)

Air conditioning system for automobiles. (No. 2,166,635)

Simple metal clamp device to be placed on automobile tires to hold ends of tire chains while they are being attached. (No. 2,166,869)

Among the design patents of the week was one for a tiny camera concealed in the bowl of a pipe. (No. 115,727)

Aircraft supercharged power plant with a radiator placed behind the engine inside the body of the plane with ducts leading air to the radiator for cooling action. (2,165,443)

Method of soil gas analysis for determining the contained hydrocarbons that will be useful in petroleum prospecting. (No. 2,165,440)

A starting system for sprint races so arranged that the starting gun cannot be fired unless all the contestants' hands are properly lined up on the mark. (No. 2,165,749)

New type of lawnmower having an enclosed horizontal cutting blade turned by power shaft mounted vertically. (No. 2,165,551)

Special system of weaving stockings to create "nonrun" hosiery. (No. 2,165,520)

A stereoscopic rangefinder with double telescope system. (No. 2,166,046)

A method of underwater riveting by explosive action. (No. 2,166,041)

An electric system of room heating by use of radiant panels. (No. 2,165,970)

A clock mechanism for automatically

opening parachutes after a specified time. (No. 2,165,954)

Process for making a pencil with multicolored lead which writes in different hues depending on wear. (No. 2,165,827)

Microphone system for recording telephone conversations. (No. 2,165,546)

Periscope mounting for cameras so that they can be sniped while held high overhead. (No. 2,165,512)

Cold storage locker room having a matrix of individual lockers each of which can be lifted by an overhead traveling crane. (No. 2,165,513)

New golfing aid to set tees at predetermined height by inserting tapered shanks of tees through different size holes in a small flat sheet laid on ground. (No. 2,165,479)

A shifting device for automobiles which makes possible curb-side parking in a space hardly larger than the length of the car. (No. 2,165,461)

Multiple engine mounting for airplanes in which two or more engines, through bevel gears, apply power to the same propeller. (No. 2,165,453)

Sanitary tooth cleaning element of sponge rubber with dentifrice included which is to be used once and thrown away. (No. 2,165,420)

Gear shift for bicycles in which the gears are changed by back pedalling. (No. 2,165,201)

Special flat type radio speaker mounting for placement on the roofs of automobiles. (No. 2,165,637)

New type thermoelectric rotary razor which burns off the whiskers. (No. 2,164,581)

Silk or rayon stocking of composition weave having resilient rubber fibers over the knee to prevent runs. (No. 2,165,012)

Chemical method of producing synthetically ascorbic acid, or vitamin C. (No. 2,165,151)

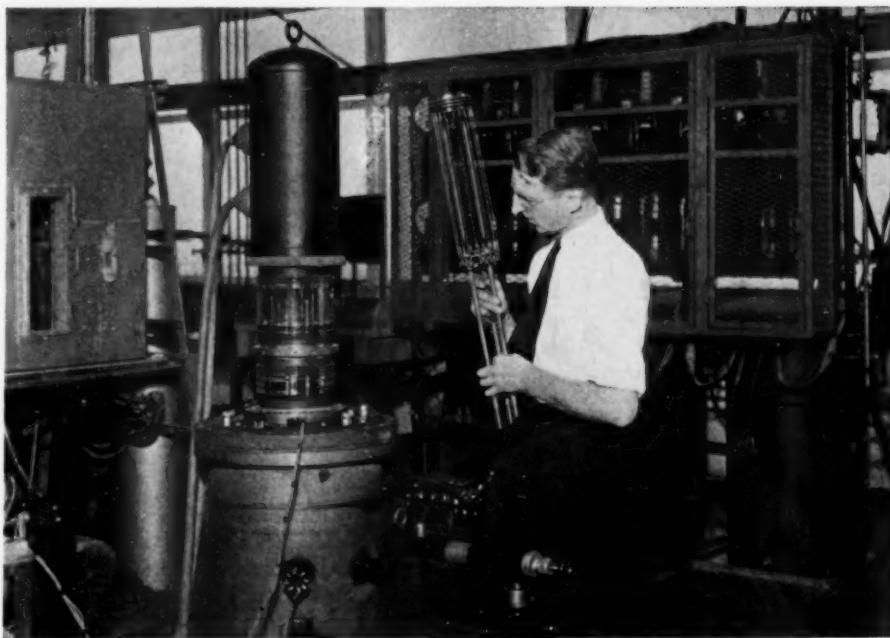
Safety electric mine lamp having an automatic circuit breaker to prevent explosions if the glass bulb is accidentally crushed in service. (No. 2,165,193)

A new means of protecting green logs and lumber from wood boring beetles by the use of diphenyl and triphenyl chemicals. (No. 2,164,328)

A transparent wound dressing provided with a nondrying adhesive made of chlorinated rubber and a plasticizer. (No. 2,164,360)

Dual training tables for instruction in the use of airplane navigating instruments. (No. 2,164,412)

For possible use of musicians, a lip exerciser consisting of a light flat spring



DEMOUNTABLE FILAMENT

*Held in the engineer's hands is the demountable filament assembly of the new giant radio tubes of station W2XAF.*

device to be inserted in the mouth and compressed with the lips. (No. 2,164,458)

A new type of rubber auto tire having two inner tubes side by side separately inflated, designed to give blowout protection. (No. 2,164,686)

Method of producing crepe effects in rayon threads by chemical treatment of the fibers before drying with a solution rendered insoluble by the drying process. (No. 2,164,479)

Controllable pitch propeller. (Nos. 2,164,489-90)

A composite fabric for wearing apparel consisting of two outer layers of pliable fabric between which is a soft packing of loose fibers for extra warmth. (No. 2,164,499)

New type of slot device for airplane wings to increase drag when needed for better control. (No. 2,164,531)

Science News Letter, August 5, 1939

#### RADIO

### America's Radio Big Bertha Gets Demountable Filaments

UNCLE SAM's radio Big Bertha—the 100 kilowatt transmitter of station W2XAF in Schenectady that sends its directed beam toward South America in competition with the radio programs of Europe's dictator nations—has radio tubes so large that they have 18 fila-

ments, each of which is demountable and replaceable.

When the station soon steps up its power from 40 to 100 kilowatts, two of these giant tubes, the first with demountable filaments, will take over the job now done by six tubes in the present power set-up.

Each tube, with its accessory units, stands higher than a man. They are not sealed permanently but are continually kept at a low vacuum by pumps.

"The impression has been gained," states C. H. Lang, manager of broadcasting for the General Electric Company, "that stations in various countries have tried to black out the signals of other stations, in order that their own signals could be heard. This is untrue and, as a matter of fact, the well-operated

## Books

SCIENCE NEWS LETTER will obtain for you any American book or magazine in print. Send check or money order to cover regular retail price (\$5 if price is unknown, change to be remitted) and we will pay postage in the United States. When publications are free, send 10c for handling.

Address Book Department  
SCIENCE NEWS LETTER  
2101 Constitution Ave. Washington, D. C.

stations of the major countries of the world have meticulously maintained their stations on the frequencies assigned to them by international agreement.

"All realize that nothing but chaos would result from intentional interference."

The thing to do, in the battle of the ether waves, is to increase the power of the signals so that the station can be heard at all times with superior reception. The new demountable filament tubes of the new 100 kilowatt is the answer of engineering ingenuity.

*Science News Letter, August 5, 1939*

#### PHYSIOLOGY

### Use of Anti-Bleeding Vitamin K Extended

PATIENTS suffering from more than one serious ailment in which there is danger of fatal bleeding can be saved by treatment with the anti-bleeding vitamin K. This increased usefulness of the vitamin appears in a recent report by Drs. R. L. Clark, Jr., C. F. Dixon, H. R. Butt and A. M. Snell, of the Mayo Clinic.

Liver disorder or injury, intestinal obstruction following operations for cancer or other conditions, chronic ulcerative colitis, and other severe intestinal disturbances are among the conditions in which the vitamin may be valuable in preventing or controlling bleeding. The vitamin, of course, has no effect on the ailments themselves, but only on the tendency to hemorrhage which may be a serious complication in such conditions.

The kind of ailments in which the vitamin is likely to be valuable can be determined from the facts now known about the vitamin's role in preventing bleeding and about its utilization in the body.

Vitamin K, the Mayo Clinic physicians state, is responsible for the normal maintenance of one of the most important of the coagulating constituents of the circulating blood—prothrombin. This substance apparently is formed in the liver with the aid of vitamin K, but the liver cannot get the vitamin unless there is bile of normal composition in the intestines and a normal absorptive surface in this part of the digestive tract. Disorders of the liver or of the intestines, or conditions which prevent passage of bile into the intestines or which make it impossible for the patient to eat vitamin K-containing foods may, either alone or in combination, cause a dangerous lowering of the prothrombin pro-

duction, with consequent tendency to hemorrhage.

The vitamin is apparently distributed widely enough in foods so that normal persons can get an adequate supply. For patients too sick to eat or unable to uti-

lize the vitamin from food a form of the vitamin from fish meal or alfalfa is now available for treatment and recent chemical discoveries suggest that the pure vitamin itself will also soon be available.

*Science News Letter, August 5, 1939*

#### ARCHAEOLOGY

## Athens' Ancient Market Place Yields Archaeological Treasure

### Contents of Royal Chamber Tomb Indicate Athens Was Not Unimportant in Fourteenth Century Before Christ

THIS year's discoveries, among them a royal chamber tomb of the Mycenaean age, by field workers at the Agora, market-place of ancient Athens, are "of the greatest importance," according to Dr. T. Leslie Shear, field director of the work. Dr. Shear, professor of classical archaeology at Princeton University, recently returned from directing the ninth season of work at the Agora for the American School of Classical Studies at Athens.

In addition to the tomb, which contained interesting sacrificial offerings, findings of the Agora workers included a number of ancient graves and wells, important boundary stones, the great drain of the Agora, and decorative objects, pottery and coins. During the 18 weeks of work, 43,852 tons of earth were removed, and 8,789 coins were uncovered.

Sacrificial offerings in the royal chamber tomb, assigned to the fourteenth century B.C., indicate that Athens of this period was not a poor, unimportant settlement. Pottery, gold ornaments and ivory boxes left in the tomb indicate a wealth and artistry of craftsmanship hitherto unknown.

Prior to this discovery, scholars believed that Athens was of little importance during the time of King Erechtheus, since the city had played only a small part in the siege of Troy.

These offerings, including more than one hundred pear-shaped leaves and rosettes of thin gold, two ivory boxes, or pyxides, a bronze mirror and ivory hairpins, were found, with the empty grave in the burial chamber. Collapse of the roof soon after burial filled the chamber with rock, and caused the hurried removal of the body, possibly that of Erechtheus' queen, and some of the offerings.

The doorway to the chamber, at the end of a passageway, was sealed up with rocks at the time of burial, and had never been opened thereafter. Removal of the

body and of the offerings was effected by means of a trench dug directly over the grave.

In the eastern part of the chamber, which had been untouched since the burial, were found the broken fragments of six large vases, in the positions in which they had originally been placed. These pieces are fine examples of Mycenaean pottery, and led the archaeologists to assign the tomb to that period. Fragments of the vases were carefully gathered and the objects almost completely restored.

A second and larger ivory pyxis, only slightly damaged, was also found in the eastern portion of the chamber. This piece, according to Dr. Shear, is "a masterpiece of artistic design and craftsmanship," showing the talent of the artists of the Mycenaean period. On the lid of the box is a representation of deer and griffins, which shows "a mastery of technique which inspires the scene with life."

Additional importance is attached to the tomb, because "archaeologists now have for the first time a tomb of the members of the dynasty which occupied the 'strong house' of Erechtheus on the Acropolis which is referred to by Homer in the 'Odyssey.'"

"We obtained some fine neolithic vases from shallow wells on the slope of the Acropolis," Dr. Shear reported, "and with them were two human skulls of a very primitive type."

The surprising discovery of a cemetery of the sixth century B.C. in the southwest corner of the area was reported. It seems to have been a burying ground of a family with foreign affiliations, for the dedicatory offerings included some imported objects, such as Lydian perfume jars, Corinthian vases, and a scarab of blue glass pottery.

*Science News Letter, August 5, 1939*



### Poisons Without Purpose

WE ARE used to the employment of poisons by animals as means of defense. The bite of a snake, the sting of a wasp, the venom from a toad's head-glands are understandable to us. To use a phraseology now considered somewhat old-fashioned, they have definite purposes; they discourage aggressors, and in some cases at least, they help the animal to secure its food by killing or paralyzing the prey.

But of what avail to the plants that form them are the toxic secretions of poisonous mushrooms, of poison hemlock, of wormwood, henbane, nightshade, jimsonweed? Most of them do not take effect for several hours, and in any case they have to be eaten before they can do any harm. An Olympian observer might see some retributive justice in this; but what good is this post-mortem revenge in terms of survival of individual or species?

A few plants can poison on contact only. Nettles are perhaps the most notable; the tiny envenomed daggers they wield undoubtedly do drive off many intruders that might otherwise trample or devour them.

But again, perhaps the worst of these contact poisoners, poison ivy and poison

sumac, do not begin to exact their penalties until after several hours have elapsed. Moreover, they poison by contact only; hooved animals have been observed eating the foliage without any apparent ill after-effects, and birds use their fruits as staple articles of winter diet.

Sometimes poisons give a bitter taste to the plants, like the alkaloids of the nightshade family (including tomato and potato leaves); sometimes a poisonous plant is ill-smelling, like skunk cabbage; occasionally bad taste and rank odor are combined, as in jimsonweed. But there are also plants that are repellently bitter without being poisonous, and some of the most poisonous plants

are neither bitter nor ill-scented. The deadliest of all the poisonous mushrooms are quite agreeable to eat; that is one reason why they have built such a Borgian record.

There is a tendency on the part of some botanists to regard plant poisons as waste products of the plants' life processes. Plants do not have the same facilities as animals for getting rid of certain types of wastes, so the next best thing is to store them in leaves and perishable parts of the stem, which will eventually be sloughed off.

However, such suggestions are at best conjectural. Plant poisons still remain pretty much of a mystery.

Science News Letter, August 5, 1939

### METALLURGY

## Weakness of Stainless Steel, Seawater Corrosion, Overcome

### Tiny Traces of Silver Will Cut Down This Type of Corrosion More Than 80 Per Cent With Better Polish

THE ACHILLES heel of stainless steel—its inability to resist the corrosive action of seawater—may be protected by the addition of tiny traces of silver, it has been discovered by scientists at Massachusetts Institute of Technology.

The new discovery, which should have great importance in marine and naval construction, arose from observations that a salt of silver, silver chloride, is insoluble in seawater. Out of this knowledge Prof. R. S. Williams and his associates at M. I. T. have found that as little as 0.42 per cent of silver will cut down stainless steel's salt water corrosion more than 80 per cent.

Not only is corrosion resistance improved but the heat conductivity of stainless steel—another weak point—is increased 26 per cent by the addition of only .14 per cent silver, according to an Arthur D. Little, Inc., report.

Other advantages claimed for silver-steel is a greater ease of machining and an improved polish. A very uniform and highly polished surface in itself inhibits corrosion.

Stainless steel's corrosion in seawater comes from tiny electrical batteries created on the surface of the steel plate by differences in oxygen concentration. A barnacle, on a ship's bottom, for example, might be the cause of this oxygen difference.

In the myriad of tiny batteries created

by this or a similar process the formation of chloride compounds of the metals in the alloy is favored. These chlorides are soluble and wash away, leaving a pitted surface. As the pits deepen the difference in concentration of oxygen increases and the corrosion goes faster and faster until the entire plate of stainless steel becomes honeycombed. To the eye its surface may look unmarred but at the danger point it may suddenly collapse.

The function of the silver in the alloy is to make insoluble chlorides under the action of seawater which form a thin, guardian layer.

Science News Letter, August 5, 1939

The cow tree of Venezuela yields a sweet milk-like latex that can be drunk or used to caulk canoes.

### SENSATIONAL SCIENTIFIC DISCOVERIES

### FASCINATING EXPERIMENTS

Soilless Gardening — Colchicine, the chemical creator of freak new plants, giant flowers—The cure for near-sightedness—Growth hormones — Sex hormones — The electric treasure finder — The strangest meteor known — Aerosol formulas — Govt. Publications — etc. — are in Quest booklet No. 1. Special offer, 5 issues \$1.00 (checks and stamps accepted) sample copy 25c. Address Quest B-2, Wellesley, Mass.

### ● Earth Trembles

Information collected by Science Service from seismological observatories resulted in the location by the U. S. Coast and Geodetic Survey of the following preliminary epicenter:

Wednesday, July 19, 9:23.0 p.m., EST

In the South Pacific about 600 miles southwest of Samoa. Latitude, 21 degrees south. Longitude, 179 degrees west.

For stations cooperating with Science Service, the Coast and Geodetic Survey, and the Jesuit Seismological Association in reporting earthquakes recorded on their seismographs, see SNL, June 17.

# \*First Glances at New Books

## General Science

LIFE AND ENVIRONMENT; The Interpretations of Living Things—Paul B. Sears—*Teachers College, Columbia Univ.*, 175 p., \$1.85. Ecology, with a human slant, written primarily for teachers of secondary schools and junior colleges. It has a goodly mixture of sociology, philosophy and whatever else you wish to call discussion, fact and theory about man in relation to the living and non-living world about him.

Science News Letter, August 5, 1939

## Library Science

THE ORGANIZATION OF KNOWLEDGE IN LIBRARIES AND THE SUBJECT-APPROACH TO BOOKS, 2nd. ed.—Henry Evelyn Bliss—*Wilson*, 347 p., \$4. That the function of the library is not merely to collect books, but to make knowledge readily available to the public is a platitude to the librarian. How best to do it is the vital question, and one which has so changed since 1933 that the second edition of this book has been largely rewritten.

Science News Letter, August 5, 1939

## Education

FEDERAL AID AND THE TAX PROBLEM—Clarence Heer—*Govt. Print. Off.*, 101 p., 15c.

Science News Letter, August 5, 1939

## Medicine

BODY MENDERS—James Harpole—*Stokes*, 296 p., \$2.75. A very entertaining book made up of stories from the surgeon-author's own case records.

Science News Letter, August 5, 1939

## Hygiene—Education

THE ADMINISTRATION OF HEALTH AND PHYSICAL EDUCATION, 2d. ed.—Jesse Feiring Williams and Clifford Lee Brownell—*Saunders*, 634 p., \$3. A textbook for administrators, teachers and professional students in the field of health and physical education.

Science News Letter, August 5, 1939

## Military Science—Aeronautics

BOMBS BURSTING IN AIR—George Fielding Eliot—*Reynal and Hitchcock*, 173 p., \$1.75. If this book, in which an approach is made to the problem of weighing the effect of air power on international relations today, were a motion picture, it would be called a "quickie": a Class B film gotten up in an awful hurry to ride the wave of public fancy. Its doctrine is sound, as is most of what Eliot preaches. However, the writing is heavy for what proposes

to be a popular volume. Its figures will cause many arguments. Eliot, with R. Ernest Dupuy, covered the same subject more lucidly and concisely in a single long chapter in "If War Comes," published three years ago. Readers will notice that Eliot who opposed the U. S. air expansion program when it was first urged by Roosevelt, has changed his mind and now finds it far from excessive.

Science News Letter, August 5, 1939

## Economics—History

ECONOMIC DEVELOPMENT OF THE UNITED STATES, A First Course—Charles Manfred Thompson and Fred Mitchell Jones—*Macmillan*, 794 p., \$3.50. A college text originating in the University of Illinois, with a minimum of reference to the influence of science and industrial research on economic history.

Science News Letter, August 5, 1939

## Economics

THE ELECTRIC POWER INDUSTRY: Development, Organization, Public Policies—John Bauer and Nathaniel Gold—*Harper*, 347 p., \$3.50. The youngest major utility, ranking only after water and sanitation in importance perhaps, is presented in its basic public setting, with due attention primarily to financial and social structure.

Science News Letter, August 5, 1939

## Medicine

OUR SEX LIFE—Fritz Kahn—*Knopf*, 459 p., \$6. A comprehensive, detailed and illustrated discussion of all phases of sex life, including sections on venereal diseases, prostitution and contraception.

Science News Letter, August 5, 1939

## Geology

THE SPENCE SHALE AND ITS FAUNA—Charles Elmer Resser—*Govt. Print. Off.*, 27 p., 6 pl., 25c. (Smithsonian Miscellaneous Collections, vol. 97, no. 12)

Science News Letter, August 5, 1939

## Public Health

EDUCATING FOR HEALTH—Frank Ernest Hill—*Amer. Assoc. for Adult Education*, 224 p., \$1.25. This is a critical review of the chief measures taken in the past and the present in the field of health education for adults. Probably many of the adults being educated will be interested as well as the educators and other health workers themselves.

Science News Letter, August 5, 1939

## Public Health

PUBLIC HEALTH LAW, 2nd ed.—James A. Tobey—*Commonwealth Fund*, 414 p., \$3.50. Expansion of public health activities in recent years makes this simple, clear and authoritative book more than ever valuable to the growing group of health officers and other public health workers, and also to physicians and city and town attorneys. This edition has been completely rewritten to include much new material and is said to be the only modern work on the subject.

Science News Letter, August 5, 1939

## Political Science

REVOLUTIONS AND DICTATORSHIPS—Hans Kohn—*Harvard Univ.*, 437 p., \$3.50. The professor of modern European history at Smith College in a book of essays looks at the modern world, gives perspective and background, and asks: "Over how many cities will the swastika fly with all that it implies of crude barbarism and lawless tyranny? The answer does not lie with the Fascist dictators. It lies with the democratic nations. Their understanding, resoluteness, and will power, or lack of it, will decide the future of democracy and the survival of human civilization."

Science News Letter, August 5, 1939

## Medicine

FROM HEAD TO FOOT—Armitage Whitman, M. D.—*Farrar & Rinehart*, 262 p., \$2.50. In forceful, clear language and with a style that has plenty of punch to add to the reader's enjoyment, Dr. Whitman, a professor of orthopedic surgery, gives a vast amount of useful information and sound advice on subjects ranging from posture and bowlegs to infantile paralysis, low back pains and workmen's compensation.

Science News Letter, August 5, 1939

## Biology—Chemistry

ANNUAL REVIEW OF BIOCHEMISTRY, Vol. VIII—James Murray Luck and James H. C. Smith, eds.—*Annual Reviews, Inc.*, 676 p., \$5. An essential aid to keeping up with the fast-moving research progress in so many important fields in this yearly summary and evaluation arranged in 25 chapters, each written by world authorities. Subject and author indices make it easy to use for reference, while the chapters can be read by those who wish to refresh or catch up on any particular subject.

Science News Letter, August 5, 1939